CHEMICAL & ENGINEERING NEWS

C&EN

OCTOBER 26, 1992

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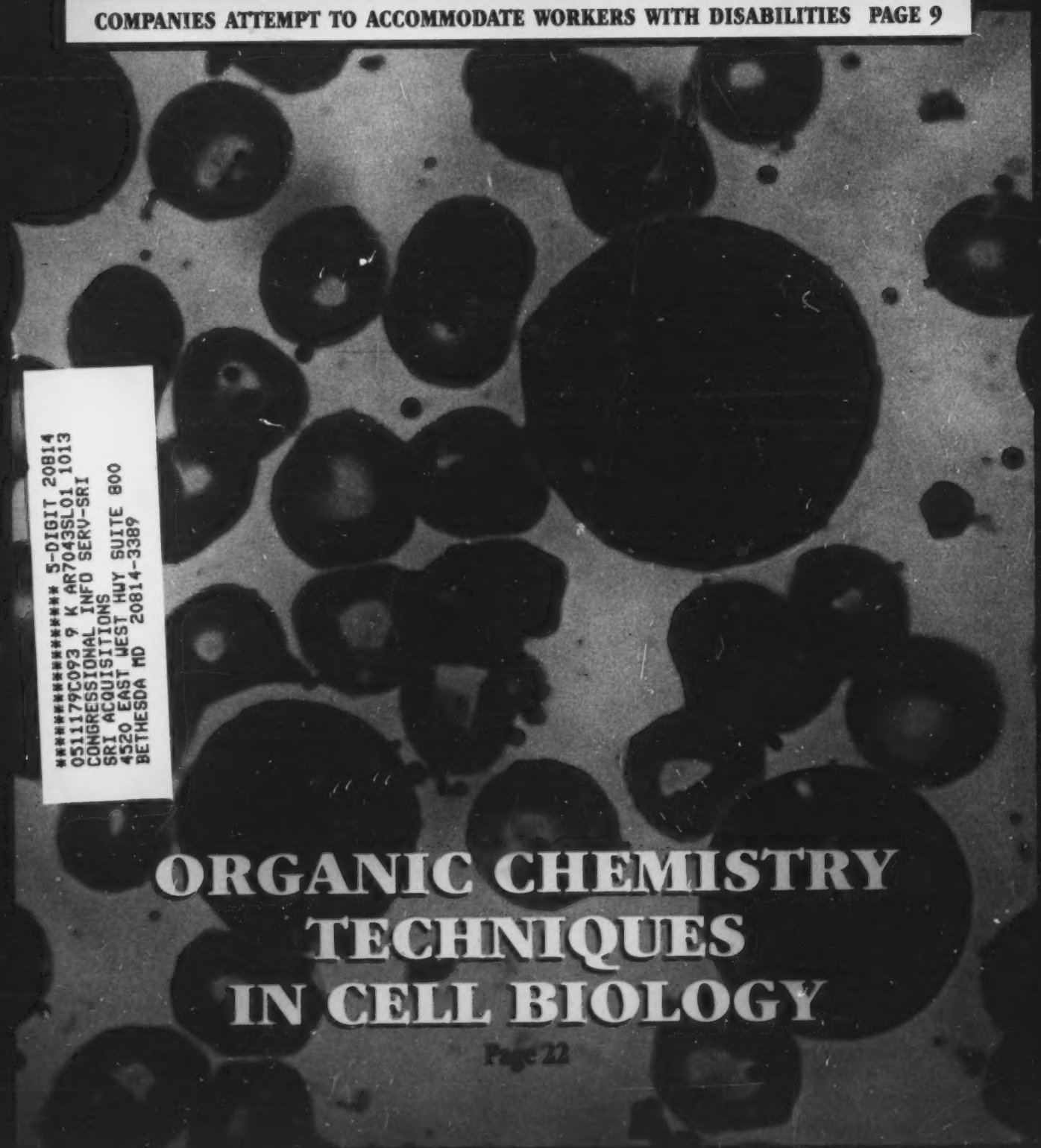
COMPANIES ATTEMPT TO ACCOMMODATE WORKERS WITH DISABILITIES PAGE 9



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CHEMICAL & ENGINEERING NEWS

C&EN

OCTOBER 26, 1992

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■ Third-quarter earnings of chemical companies showed improvement over last year's results, but Monsanto's and Dow's fell sharply. **Page 5**

■ Penn State researchers announce development of a solid-state process for making synthetic diamond. **Page 5**

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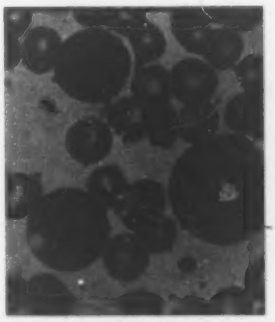

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LETTERS

Racemic, scalemic polemic

The recent series of letters to C&EN on terms to describe mixtures of enantiomers that are not racemic was brought to the attention of the International Union of Pure & Applied Chemistry Commission III.2 (physical organic chemistry). The topic was discussed at the recent meeting of the commission in the context of its review of a draft "Glossary of Stereochemical Terms," which has been submitted by a working party on stereochemical terminology for approval by IUPAC.

In view of the extent and liveliness of the published correspondence, it was decided to anticipate a formal ruling by IUPAC and to communicate the present views of the commission on this matter informally in a letter to C&EN. As one of its representatives on the aforementioned working party, the task was assigned to me.

The correspondence is motivated by the need felt by several stereochemists to find alternatives to the currently used terms "enantiomerically pure" and "enantiomerically enriched." The use of "homochiral" for the former has met with universal disapproval and is specifically discouraged in the draft glossary, but the discussion seems to have gone off at a tangent with Clayton Heathcock's (C&EN, Feb. 4, 1991, page 3) revival of James H. Brewster's proposal of the term "scalemic" and the latter's amplification thereof (C&EN, May 18, page 3). its proponents reject the generally accepted terms, as well as their contractions "enantiopure" and "enantioenriched" as "cumbersome." The difficulty is that it is not clear which of the two terms scalemic is intended to replace.

Takeshi Nakai (C&EN, July 1, 1991, page 2), for example, states that "scalemic and racemic comprise a pair of words that are the macroscopic counterparts of chiral and achiral," going to the unacceptable extreme of referring to "scalemic and racemic *molecules*." This view is presumably shared by Hubert Maehr (C&EN, Aug. 26, 1991, page 2), who proposes the unwieldly "ambiscalemic" for substances of unknown absolute configurations. In contrast, Brewster and Heathcock propose to invest scalemic with quantitative meaning, to the extent of setting up a "scalemicity scale." Evidently, to Nakai and Maehr scalemic means enantiomerically pure, whereas to Brewster and Heathcock it represents a variable degree of "enantiorichness," with "enantiopurity" specified as "100% scalemicity."

The proposal is criticized trenchantly by Guy Ourisson (C&EN, June 8, page 3), who points out that scalemic is an "etymological monster" but is careful not to advocate the use of the more correct "scalemic" because of the term's inherent ambiguity.

Enantiomerically pure and enantiomerically enriched are indeed cumbersome, but Robert S. Coleman's (C&EN, July 22, 1991, page 3) proposal of homoenantiomeric for the former and—by logical extension—isoenantiomeric for the latter is certainly no less so than the commonly used enantiopure and enantioenriched. We therefore propose that the latter contracted forms should be adopted officially as more concise alternatives to the full terms.

Ernest Eliel and Samuel H. Wilen (C&EN, July 22, 1991, page 3) argue that the distinction between enantiopure and enantioenriched is experimental, so a conceptual term is needed to describe macroscopic mixtures of enantiomers that are not racemic. They propose the term aracemic, which they recognize to be a Greek-Latin hybrid, in preference to the linguistically "purer" but less "crisp" nonracemic.

There can be no objection to referring to a sample of a chiral compound that is not racemic as being "non-racemic," but this is hardly a good enough reason for revising it to the etymologically infelicitous aracemic and introducing it as a separate term. This being said, we do not agree with Brewster that both forms of the term "clearly imply that racemate is an impurity" any more than achiral implies that a chiral molecule is abnormal. Therefore, if the need is felt for a purely qualitative term to describe any unequal macroscopic mixture of enantiomers, be it 51:49 or 99:1, we are prepared to go along with non-racemic, retaining the hyphen.

Since organic chemists now routinely apply nonoptical methods to the determination of enantiomeric and diasteriomeric ratios, we agree with Brewster that provision should be made for the direct expression of these ratios. However, there is no need to coin a new term such as scalemicity, for which there is no obvious diasteriomeric equivalent, when enantiomeric ratio and diasteriomeric ratio are self-explanatory. We propose the inclusion of these two terms in the glossary, retaining enantiomeric excess and diasteriomeric excess as well, since the older terms will probably remain in use for a long time to come.

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Disabilities Law Is Being Implemented By Companies as Needs Arise

■ ***Law granting equal job participation and access to the disabled is bringing about changes, but only gradually***

Ann M. Thayer,
C&EN Northeast News Bureau

The Americans with Disabilities Act (ADA) of 1990 went into effect Jan. 26, 1992. It is aimed at expanding civil rights protections and making workplaces, public facilities, and transportation accessible to 43 million people with disabilities. Starting this past July 26, any company with more than 25 employees is required to abide by the employment provisions of ADA. In two years, the law will extend to cover even smaller businesses--those with 15 to 25 employees.

Companies in the chemical industry independently have been laying the groundwork for complying with the law and now are putting it into practice. Before ADA's effective date, Dow, Du Pont, and Monsanto were among those companies that had put together ADA task forces. Such teams generally involved people from all areas of company operations who were brought together to address company policy, evaluate any necessary changes, and inform and educate employees at company sites.

Under ADA, individuals with disabilities must be provided access to all public accommodations and must be given equal opportunity in all aspects of employment. The law does not contain any affirmative action stipulations or quotas. Employers cannot discriminate against otherwise qualified people with physical or mental disabilities in hiring, promotion, compensation, training, or benefits. Employers are not required to change their health insurance policies if they apply equally to all employees.

A disability is broadly defined as having a record of, being regarded as, or having a physical or mental impairment which "substantially limits" one or more major life activities. Some specific conditions are considered disabilities: AIDS, epilepsy, paralysis, cerebral palsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, mental retardation, and some learning disabilities. Not included as protected disabilities are simple physical characteristics, pregnancy, some personality traits, a lack of education, or a prison record, but some emotional and stress-related illnesses are covered.

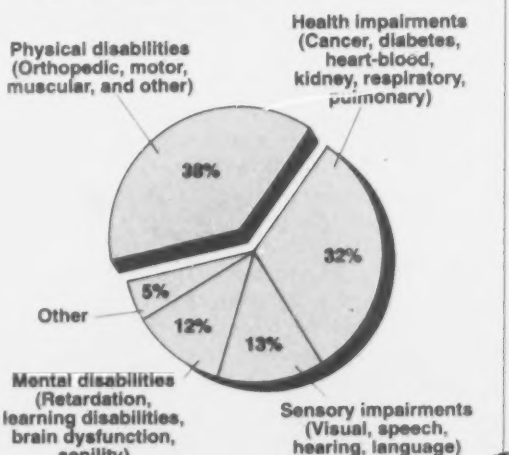
Past illegal use of drugs and alcoholism are covered as disabilities. Current illegal drug use is not covered and drug testing is allowed. An employer may deny employment or fire an employee if alcohol use adversely affects job performance or conduct. Occupational health and safety concerns can have a bearing on employment if there is a direct threat to an individual or to other employees.

Drug use as a covered disability under ADA is what Louise Perna, coordinator for disability programs in Du Pont's human resources department, calls a "gray area." It has not yet been determined, she explains, what rehabilitation programs are acceptable or after what drug-free period of time an individual can be considered recovered. Another such gray area is labor relations in which there may be conflicts between union agreements and what is required under ADA. There has been no agreement yet, Perna says, on how unions will be bound by the provisions of ADA.

In addition to the employment issues, most companies also must meet public accommodations provisions of the law. Immediate changes may be needed in company buildings or facilities that are open to the public, or in transportation. "Monsanto did make sure that tour routes at its various facilities were accessible," says Gwen Wesley, Monsanto's director for equal opportunity affairs, "and that the company's cafeterias and auditoriums were accessible because people ... use Monsanto's facilities."

Determining exactly who has rights under ADA and what obligations fall to companies will be an evolutionary process for all involved, say human resource managers and management consultants. But for many companies, ADA does not present a radical departure in employment practices. Many chemical companies have had experience with employing the disabled under

Most working-age disabled people are physically impaired



1991 total = 13 million disabled people of working age

Source: National Council on Disability

the Rehabilitation Act of 1973, which covers all federal employees and companies with government contracts of more than $50,000. But, because ADA extends much beyond the Rehabilitation Act, there is concern about companies using it as an excuse not to make changes.

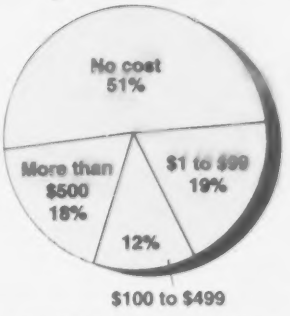
In a 1992 Hay Group survey of human resources managers at 32 chemical companies, more than half said adapting to work force diversity was important, but not considered a priority and ranked well below other personnel management issues. "It's probably going to have to be like other civil [rights] legislation that's been passed, in the sense that a number of companies are going to have to be penalized or something is going to have to happen that focuses the attention on [ADA]," says Thomas McCarthy, managing director of the chemical industry practice at Hay Management Consultants in Philadelphia. "If EEOC [the Equal Employment Opportunity Commission] does not take an active role, I suspect that not much will change," he adds. "[ADA] is subject to such varied interpretation that it is going to be years before there is enough substance and practice established to give companies guidance on what to do."

Under ADA, employers must make sure their employment practices do not present any bias against disabled individuals. Job applicants or employees cannot be asked about their disability or medical history, and preemployment medical exams have been limited greatly. A job offer can be conditioned on the results of a medical exam as long as the exam relates directly to the tasks of the job. All medical information must be kept confidential and segregated from an employee's records.

Employers may ask what accommodations, if any, are necessary for a qualified individual to perform the "essential functions" of a job. "Outside the compliance with architectural and facilities concerns, most organizations are taking a serious look at the duties and responsibilities of various jobs," says Charles Lee, vice president at New York City-based management consulting firm Towers Perrin. "The good news is that they haven't done that for a long, long time and they need to. It will give them a chance to focus on new technology that exists as well as on the actual steps necessary to accomplish the mission of a job."

An employer must provide "reasonable accommodations" as long as they do not present an "undue hardship" for the company. The biggest challenge for many companies may be thinking of jobs in terms of essential functions, says a spokesman for EEOC, but, once accomplished, understanding what accommodations are needed, be they physical changes or otherwise, will become a natural part of the process. EEOC oversees the employment-related aspects of ADA, whereas the Department of Justice and the Department of Transportation will handle public accommodations and public transportation aspects, respectively.

Most costs of changes for disabled workers small



Source: Equal Employment Opportunity Commission

Monsanto, Dow, and Du Pont are, as the law advises, defining the essential functions of a job on a case-by-case basis as job positions are advertised. And, rather than trying to make sweeping changes to accommodate hypothetical disabled employees, which would be costly and ineffective, the companies intend to respond to the needs of specific employees when they arise. "Organizations aren't usually comfortable with being responsive," says Lee. "They like to think they can plan for everything, but [ADA] doesn't allow for much planning except to train managers and employees to recognize that there will be people with disabilities coming to work."

Another challenge, possibly over and above management's willingness or unwillingness to accommodate disabled employees, says McCarthy, may be employee attitudes. "Some companies probably need to assess the attitudes of their employees toward people with disabilities," he says. "Companies can make all the accommodations necessary, they can go through job descriptions and sanitize them and identify the essential functions, they can change the physical layout of their buildings or their plants, and they can change their policies to make certain that discrimination is not an accepted practice, but the working relationship of employees with disabled workers is a big obstacle to overcome."

As with other parts of the law, ADA guidelines for accommodations are not specific in defining what is considered reasonable or an undue hardship. And a great deal of discussion and concern has centered on the potential costs of accommodations, which can include modifying facilities. What will be considered an undue hardship will depend on the nature of an accommodation, the size of the company, and the company's financial status, and has not yet been determined by Monsanto, Dow, or Du Pont.

The majority of "reasonable accommodations" cost less than $100, says a spokesman for EEOC, with more than 80% costing less than $500. In addition, there are tax credits for making accommodations, but these offer benefits only to small companies. Companies with less than $1 million in revenues or fewer than 30 employees can gain tax credits of up to $5000 on qualified expenditures of $10,000. Under Internal Revenue Service codes, companies spending on access for the disabled can take a tax deduction of up to $15,000 for removing architectural barriers to the handicapped.

Human resources managers and management consultants all say the actual cost of many accommodations can be low. "In most cases, it's a matter of creativity," explains Perna. "A lot of people will be quick to purchase a specially constructed water fountain when the only thing really needed was a [paper] cup dispenser." Cost has not been an issue in accommodations made thus far at Dow, adds Rita Shellenberger, Dow's manager of personnel diversity, and major modifications of bathroom facilities and elevators were something the company had already been doing. Monsanto's data regarding its accommodations are limited, says Wesley, because the company has not bothered tracking costs.

Accommodation need not only include removing barriers or other such physical changes, but also can mean changing work schedules, reorganizing nonessential job functions, altering training programs, or providing assistance such as readers or alternative materials. Companies say one valuable source of

suggestions for accommodations and assistance for businesses in hiring disabled people is the Job Accommodation Network, Morgantown, W.Va., a branch of the President's Committee on Employment of People with Disabilities. EEOC's ADA Services division is preparing policy guidelines on some of the more vague aspects of the law, such as insurance, workmen's compensation, medical inquiries, and drug testing.

Compounding the apprehension surrounding ADA is that the financial stakes for not complying could be high. Available remedies—making required accommodations, hiring, reinstatement, compensation, or legal action—fall under the provisions of the Civil Rights Act and allow for damage awards of up to $300,000 against larger companies. Enforcement is expected to be driven by employee complaints filed with EEOC, which will review violations on a case-by-case basis. EEOC anticipates more than 12,000 new complaints per year, or about a 20% increase. In the first few months after enactment, says EEOC, more than 250 complaints were filed nationwide.

A prevalent attitude holds that ADA's fine points will be defined inevitably in the courts. Unlike other civil rights actions, lawsuits are expected to be on behalf of individuals, rather than class action suits, because it is difficult to group individuals in terms of disabilities. Others hope that, rather than through litigation, reconciliations and accommodations will be met through negotiation with EEOC and with individuals filing complaints. Experience under the Rehabilitation Act, says Lee, suggests that most employers will want to resolve any issues and that major lawsuits will not result.

Although many observers bemoan the government's intervention with yet another regulatory burden, many others say ADA offers an opportunity that will help to expand the pool of qualified workers. Du Pont has surveyed its work force for the past 35 years to evaluate the effectiveness of its more than 3000 disabled workers. In the latest survey from 1990, about 90% of disabled workers equaled or exceeded the performance of nondisabled workers as related to safety, job performance, and attendance. However, the law has gone into effect at a time when hiring is sluggish and it may take time before any impact on the number of disabled employees is seen. □

Arco Chemical Americas chief plans cost cuts

Marvin O. Schlanger may be new to the Arco Chemical Americas unit, but he is not unfamiliar with the operating, marketing, and regulatory challenges facing it. The newly appointed president of the Arco unit formerly served as Arco Chemical's chief financial officer. In his first interview with C&EN since assuming his new role, Schlanger outlined his plans to cut costs, increase productivity, and find markets to use new production just coming on line in Channelview, Tex.

Schlanger succeeds John G. Johnson Jr., who resigned in September to pursue other interests. Johnson left his successor a sizable company with $2 billion in 1991 sales, representing about 65% of Arco Chemical's nearly $3 billion in annual sales. In addition to Arco Chemical Americas, which produces products in the U.S. for sale throughout the Western Hemisphere, Arco Chemical consists of two smaller geographic units—Arco Chemical Europe and Arco Chemical Asia Pacific.

The Americas unit is a business that, like Atlantic Richfield Co.—which owns 84% of the chemical company—is preoccupied with lowering the cost of doing business in this recession. And like other chemical industry competitors, the Arco Chemical units must deal with slow demand for their products, which has, in turn, curbed profit margins in these uncertain times.

The recession has hurt, as did a 1990 fatal accident at Channelview that temporarily shut down production at the site (C&EN, July 16, 1990, page 4). Arco Chemical Americas' sales increased 2% a year from 1989 to 1991 to $2 billion, and annual operating earnings declined 5% a year during the same period to $379 million in 1991. That is in contrast to the "go-go" years between 1986 and 1988 when Arco Chemical Americas registered a compound annual sales growth of 22%, reaching more than $2 billion. Compound annual operating earnings growth for the period was 34% or $664 million. (Arco Chemical's shares started trading publicly in October 1987.) In the first six months of this year, Arco Chemical Americas' sales were up 5% to $975 million compared with the same period a year ago, whereas pretax earnings rose 4% to $192 million.

Schlanger: find new product applications

Slow business and excess capacity is a problem that Schlanger acknowledges he will have to deal with. "Clearly we have added a lot of capacity to our system." Their new Channelview plant—a large one, coming as it does at a time when industry growth has slowed from the heyday of the late 1980s—is now coming on line. It will add more than 1 billion lb of styrene production, almost doubling the company's current U.S. styrene capacity. It will also add 500 million lb of propylene oxide, effectively increasing Arco's U.S. capacity almost 30% (C&EN, March 2, page 9).

As a result, capital spending will drop for Arco Chemical overall from the $400 million to $600 million the company had been spending annually to $250 million for this year and next. Schlanger explains: "We've made a big investment in our assets base, and we want to get these assets productive. [Also] markets are not growing as fast as we thought they would a few years ago, so we can defer a number of market-driven projects without giving up our long-term market share."

Schlanger says Arco Chemical is working with customers to "find new applications for [our] products to grow the markets and increase our capacity utilization." He says the company has had some success in promoting propylene glycol, which has a lower toxicity profile, as a replacement for ethylene glycol in aircraft deicing and automotive coolant applications. "We have a number of regional distributors who are pro-

Congress Holds Federal R&D Funding At Current Level for Fiscal 1993

■ ***Zero increase in total R&D budget may be omen of the future as legislators act on notion that research must be useful***

Janice R. Long, C&EN Washington

Congress enacted all of the 13 appropriation bills needed to fund the federal government in fiscal 1993 before it adjourned on Oct. 9. The result for the research community can best be described as bleak. But money wasn't the only subject of attention during those last few days of the 102nd Congress. Lawmakers also completed work on a new national energy policy, a major tax bill (C&EN, Oct. 12, page 9), and a number of other bills of interest to the chemical community.

The overriding themes in the fiscal 1993 research appropriation bills—competitiveness, critical technologies, technology transfer, the idea that research must be "useful"—may foreshadow the future direction of the federal research enterprise. In addition, the zero increase in total research funds set by Congress may not be just an aberration but an omen of things to come.

Contributing heavily to holding the line in total research funding is a 1% decline, to less than $38 billion, for the Department of Defense's research, development, test, and evaluation programs. With the end of the Cold War, Congress is looking for ways to ease the conversion of the military establishment and defense industry into the domestic economy. One way of doing this is to focus Defense's research programs on critical dual-use technologies that can benefit U.S. defense as well as contribute to U.S. economic and industrial competitiveness. Congress directed that $861 million, or 2% of the R&D budget, be spent on such projects in fiscal 1993, including $30 million for advanced materials synthesis and processing, $65 million for high-temperature superconductor and diamond materials, and $100 million for a manufacturing extension program. That percentage is sure to grow in the coming years.

Defense's research budget also includes $635 million for health research, including $210 million for breast cancer research and $56.9 million for AIDS research by the Army. Funding for university research initiatives will be $325 million, a 2% increase over current funding.

The Congressional emphasis on competitiveness also surfaced in determining the National Science Foundation's 1993 appropriation. NSF has long been noted for its support of basic research performed by individual investigators. However, conference committee members assigned to resolve differences between the House and Senate versions of NSF's budget, noted a report by the National Science Board (NSB) on the strength of U.S. industrial R&D (C&EN, Aug. 17, page 7), which concludes that the U.S. spends too few dollars on R&D in industrial science and technology; does not allocate R&D expenditures well; and does not utilize its investment effectively. "If NSF is to help transform this condition, it seems apparent that it must, in fact, change the fundamental emphasis it places on various research initiatives," the conferees wrote.

The Senate had decided to change NSF's emphasis unilaterally. Its version of the appropriation bill contained a number of directives aimed at increasing NSF's ties with industry and focusing its activities on "technologies deemed to be critical to the nation's future." However, those directives were forestalled because NSF is, itself, seeking to redefine its role as evidenced by NSB's establishment of a commission on the future of NSF (C&EN, Aug. 24, page 6). The conferees agreed to set aside the Senate directives until the commission finishes its work—but warned that any changes it recommends must be "serious, substantive, and broad-based in the foundation's approach to R&D."

These efforts to reform NSF are set against the backdrop of the first cut in many years in funding for NSF's research and related activities, which declines 1% to $1.9 billion in 1993. Funding for education and human resources increases 5% to $488 million, and that for instrumentation and facilities rises 52% to $50 million. A Senate provision that called for spending $55 million on a new NSF defense conversion traineeship program for defense engineers was dropped from the final appropriation bill.

Another Senate-approved defense conversion program was dropped from the National Institute of Standards & Technology's (NIST's) appropriation as well. That $109 million program, which would have been funded out of savings from cutbacks in defense spending, was intended to capitalize on the agency's technology extension programs to facilitate the conversion of parts of U.S. industry to nondefense manufacturing. The program was deleted only because the Office of Management & Budget warned that it actually involved "domestic discretionary" spending, subject to strict budget controls, and its enactment would trigger an across-the-board cut in all the programs funded under the bill. However, NIST still posts the highest increase, by far, of any research funding agency. Its 1993 budget increases 56% to $384 million.

Funding decisions for the other research agencies were relatively straightforward, if disheartening to the research community. For the first time in years, a funding increase for the National Institutes of Health won't even keep up with a very low rate of inflation. Its budget rises just 2% to $10.3 billion, with funding for the human genome sequencing project up 1% to over $106 million. The National Aeronautics & Space Administration's research budget is also up just 1% to $7.1 billion, as funding for the space station rises 5% to $2.1 billion. The

Federal research budgets very tight in 1993

$ Millions	1993 Appropriation	1993 Request	1992	% difference Appropriation-request	% change 1992–93
Defense R&D	$37,962.2	$38,626.4	$38,765.9	−2%	−1%
Tactical programs	13,518.9	13,241.1	14,742.7	2	−8
Intelligence and communications	4,794.1	5,011.2	5,201.4	−4	−8
Technology base	4,517.8	4,083.9	4,184.8	11	8
Defensewide mission support	4,331.8	3,960.8	3,846.8	9	13
Strategic programs	4,148.1	4,507.1	4,278.7	−8	−3
Strategic Defense Initiative	3,613.1	5,312.4	3,321.3	−32	9
Advanced technology development	3,038.4	2,509.9	3,090.2	21	−2
NIH	10,322.8	10,579.7	10,071.6	−2	2
National Center for Human Genome Research	106.4	110.4	104.9	−4	1
NASA R&D	7,075.0	7,687.4	7,004.7	−8	1
Soace station	2,088.9	2,238.9	1,986.8	−7	5
Energy	6,683.0	6,684.6	6,357.1	0	5
Energy R&D	5,416.9	5,270.4	4,924.5	3	10
General science and research	1,471.8	1,652.7	1,472.5	−11	0
Superconducting Super Collider	517.0	650.0	483.7	−20	7
Supporting research and technical analysis	966.4	971.6	867.2	−1	11
Basic energy sciences	859.7	813.9	764.7	6	12
University and science education programs	55.7	55.7	54.5	0	2
Environmental restoration and waste management	709.7	707.0	602.5	0	18
Fossil fuel	421.9	311.3	452.3	36	−7
Environmental R&D	356.7	384.7	353.7	−7	1
Fusion	339.7	359.7	337.1	−6	1
Conservation	314.8	326.1	260.1	−3	21
Nuclear	311.4	310.3	336.7	0	−8
Solar, other renewables	254.5	247.0	242.8	3	5
Weapons R&D	1,536.1	1,414.2	1,432.6	9	7
NSF	2,555.5	2,888.0	2,465.8	−12	−4
Research and related activities	1,859.0	2,211.5	1,879.8	−16	−1
Education and human resources	487.5	479.5	465.0	2	5
Antarctic program	158.0	163.0	88.0	−5	80
Instrumentation and facilities	50.0	33.0	33.0	52	52
Critical Technologies Institute	1.0	1.0	0	0	100
USDA	1,361.9	1,300.1	1,396.7	5	−2
Agricultural Research Service	695.4	714.0	711.5	−3	−2
Cooperative State Research Service	482.2	416.0	504.7	16	−4
Forest Service research	184.3	170.1	180.5	8	2
Commerce	586.2	504.4	459.7	16	28
National Institute of Standards & Technology	384.0	310.7	246.7	24	56
Oceanic and atmospheric research	202.2	193.7	213.0	4	−5
EPA R&D	323.0	338.5	320.9	−5	1
TOTAL	$66,869.6	$68,609.1	$66,842.4	−3%	0%

Source: Congressional reports on fiscal 1993 appropriation bills

Environmental Protection Agency's extramural research budget is also up just 1% to $323 million, and the Department of Agriculture's research budget is down 2% to $1.4 billion. Compared with these agencies the Department of Energy's budget for energy R&D looks positively rosy, with an overall increase of 10% to $5.4 billion.

However, even as Congress was holding research funding increases to a bare minimum, it continued to earmark millions of dollars for projects at specific academic institutions. Sen. Sam Nunn (D.-Ga.), chairman of the Senate Armed Services Committee, objected strenuously during debate on the conference report on the Defense Department's appropriation bill to language inserted by House conferees mandating the expenditure of some $196 million for projects at 31 colleges and universities. That includes $95 million for 10 projects that Rep. George E. Brown Jr. (D.-Calif.) had been successful in having deleted from the conference report on the Energy Department's appropriation bill.

The $95 million is split, just about evenly, among the following 10 projects:

- Bishop Science Center, Hawaii.
- Ambulatory Research & Education Building, Oregon Health Sciences University, Portland.
- Center for Energy & Environmental Resources, Louisiana State University, Baton Rouge.
- Advanced Technologies Institute, University of Connecticut, Storrs.
- Biomedical Research Facility, University of Alabama, Tuscaloosa.
- Cancer Treatment Facility, Indiana University School of Medicine, Indianapolis.
- Cancer Institute of New Jersey.
- Northeast Environmental Resource & Renewal Facility, Mayfield, Pa.
- Center for Advanced Industrial Processes, Washington State University, Pullman.
- Hahnemann University Ambulatory Care & Teaching Center, Philadelphia.

Both NASA's and EPA's appropriation bills are also riddled with apparent earmarks for various research projects, though it quite often is hard to tell whether the funds represent Congressional add-ons to funds requested by the federal agency in question or if they are for entirely new projects the agency never heard of.

For example, the House-Senate conferees directed NASA to spend $10 million for the University of Utah Intermountain Network & Scientific Compu-

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tation Center; $4.5 million "for the Oregon system of higher education for computer network infrastructure for advanced technology and education projects"; and $400,000 from its Earth sciences research and analysis budget for the University of Nebraska, Lincoln.

EPA was told to spend $700,000 for urban waste management research at the University of New Orleans; to fund a $1.45 million pollution prevention R&D center at the University of Georgia, Athens; and to spend $1.6 million with the University of North Dakota, Grand Forks, for a cradle-to-grave assessment and control technology development program for toxic metal emissions. The list of projects contained in the various appropriation bills goes on and on.

Nunn called these and the other 21 House earmarks a "slap in the face of good government," adding that the message Congress is sending to colleges and universities is that "the sure way to be funded is not through excellence or performance or through merit-based selection: The way to be funded is through the office of a member of Congress, regardless of the value and the merit of the proposed research." He pointed out that the seven Senate earmarks, totaling about $75 million, do not mandate expenditures but rather leave it up to the Secretary of Defense to decide whether the projects merit funding.

Among the other bills cleared by Congress in the final days of the session was S. 2941, which expands the small business innovation research (SBIR) program. The bill gradually increases the percentage of extramural R&D budgets that federal agencies with annual R&D budgets of $100 million or more must set aside for the program, beginning at 1.5% in fiscal 1993 and 1994, rising to 2% in 1995 and 1996, and finally to 2.5% in 1997 and thereafter. The maximum size of a phase 1 SBIR award rises from $50,000 to $100,000 and that of a phase 2 award from $500,000 to $750,000. Federal agencies whose R&D budget exceeds $1 billion are required to initiate a pilot technology transfer program to fund cooperative R&D projects involving a small company and a researcher at a university or at one of the contractor-operated national labs.

Other bills that Congress passed include one that makes it clear that states and their officers or employees can be sued for patent or copyright infringement and, if found guilty, must pay the same penalties as any private entity;

one that authorizes a $35 million NSF grant program for community colleges interested in upgrading their science and technical education programs and in obtaining state-of-the-art instrumentation; one that creates an NSF research program to develop membrane processes for treating contaminated water; and another that increases the base rate for the excise tax on ozone-depleting chemicals to $3.35 per lb in 1993, $5.35 per lb in 1995, and by 45 cents per lb per year thereafter.

In addition, the Senate ratified a United Nation's treaty, signed by President Bush at the Rio Earth Summit, that requires signatory countries to report on the efforts they are making to limit emissions of "greenhouse gases." And Congress altered a law requiring cleanup of hazardous waste on federal lands before any portion can be sold or transferred to local governments or private entities, by permitting the sale of uncontaminated parcels prior to total cleanup. Bush is not expected to sign that bill. □

Flaws cited in NIH gene patent application

The National Institutes of Health may be able to clear up some of the weaknesses that caused the Patent & Trademark Office to reject the agency's first stab at patenting partial genetic sequences. But the final decision is likely to be the same as the patent office's initial reaction, according to a lawyer familiar with the case: No patent.

On Aug. 20, in what is called a "first office action," the patent office rejected NIH's application for patents on thousands of partial human gene sequences, most of whose functions are unknown. NIH had sought to patent the research work of former NIH researcher J. Craig Venter and coworkers so the scientists could share their data with others without forfeiting intellectual property rights. The application attracted bitter disapproval from critics who fear it will inhibit free flow of information among scientists (C&EN, June 8, page 21).

Such first-round rejections happen all the time, according to Henry Wixon, a Washington, D.C., patent lawyer active in the Association of Biotechnology Companies (ABC) patent affairs committee. Neither NIH nor the patent office has released the decision, but Wixon, who has seen a copy, reviewed it at a recent ABC forum. NIH will attempt to answer the patent examiner's objections and the back-and-forth reiteration will be repeated several times before a final decision is laid down, he said.

The examiner's initial rejection of the NIH gene fragment patent is clear-cut. Wixon said it characterizes the application's claims as "vague, indefinite, misdescriptive, inaccurate, and incomprehensible." The application itself admits the gene sequences in question have a low probability of encoding polypeptides and may contain errors, he said.

The decision says the application failed to make the case that the claimed invention was novel, had utility, and was nonobvious, according to Wixon. Venter, who has left NIH and now heads the private Institute for Genomic Research, told the ABC forum that he was particularly concerned about the ruling on obviousness.

"The ruling was that all our sequences are obvious because [the patent office] found random 15-mers [15-base fragments] that match our sequences in databases," Venter said. He has proposed that Congress change U.S. patent law so that full genes can be patented even if such fragments have already been published.

The decision also brought into the open the dispute over the controversial patent application between NIH and its parent agency, the Department of Health & Human Services, which would like the application withdrawn. The patent examiner refers to a June letter from HHS general counsel Michael J. Astrue that says the application may not be strong enough to warrant a patent.

"NIH shouldn't be second-guessed," Wixon said. "It would be unfortunate if Astrue succeeds and the government pulls the claim before we can have a full discussion of the issues."

However, Wixon predicted the application will ultimately be rejected even if NIH tries to revise it to meet the patent office's objections. "This issue is too hot for the patent examiner to allow it," he said. "He will kick it up to the Board [of Patent Appeals & Interferences]. And they may kick it up to the U.S. Court of Appeals."

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